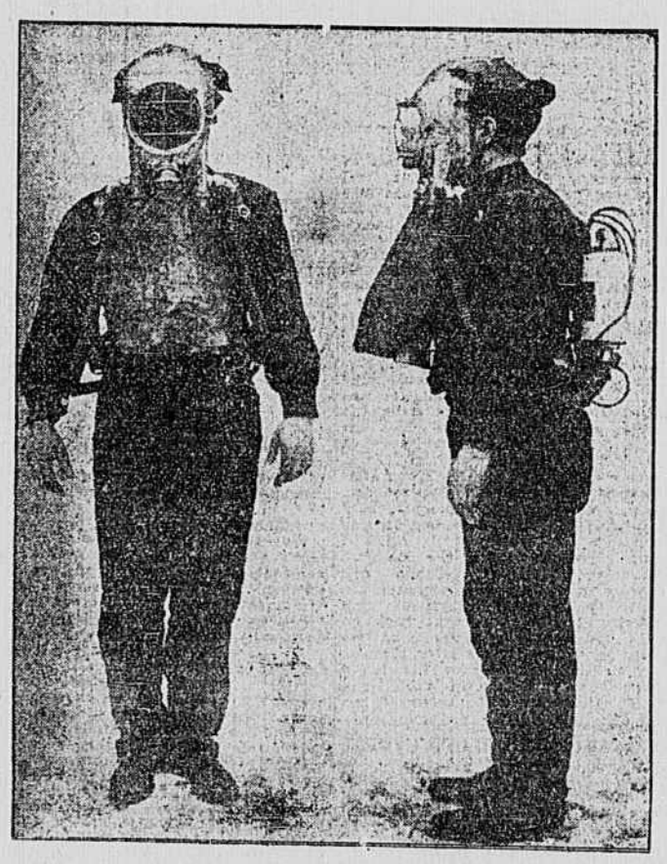
Uncle Sam and Miners---King Coal's Terrible Death Roll and How Government Will Reduce It---Testing of Explosives

Upper—The great steel cylinder at Pittsburg. The cannon is at the right end.
Lower—Snapshot of cylinder at time of explosion.

Mine rescue car. It is a hospital on wheels and a schoolroom as well.



OXYGEN HELMET, SHOWING FRONT AND SIDE VIEWS.

MAKING A DEAD MAN BREATHE.

BY FRANK G. CARPENTER.

Washington, D. C.

This letter is devoted to the men who work below the ground. It deals with one of the most important movements of Uncle Sam, Patriarch. It shows what is being done to save the lives of the coal miners; to insure them from explosions, from the caving in of the roofs and walls of the mines, and from the terrible underground fires that, in blazing sheets, run from tunnel to tunnel. It relates to the Bureau of Mines, which although established by Congress only last year, has already saved many lives.

King Coal's Death Roll.

"Old King Coal is a cruel old soul,
And a cruel old soul is he."

Indeed there is no more terrible monarch! He has 700,000 slaves, who are compelled to delve in the darkness, and during the past twenty years he has sacrificed upon his subterranean altars the lives of more than 30,000 men. He killed more than 3,000 in 1907, and he is now murdering upward of 2,400 a year. In every coal camp of 1,000 miners, four or five heads of families annually lose their lives, and this to say nothing of the much larger number who are wounded and maimed. In 1907, in addition to the killed, almost 8,000 were injured, and Director Holmes, of the Bureau of Mines, estimates that from 8,000 to 10,000 are woulded or killed by mine accidents every year, and that this continues year in and year out, as the decades go on.

The worst of it is that our death rate and accident rate are far in excess of those of the coal region of Europe, where the mines are much deeper and the workings far more dangerous. In Belgium, which is noted for its deep mines, the average death rate per thousand from 1901 to 1906 was only a little more than one, whereas we lost more than three miners out of each thousand employed during every one of those years. The death rate in Belgium is now considerably less than one, and it has had a steady decline since 1860, when it was something like ours. Great Britain now kills about one and three-tenths of a man to its each thousand miners, Russia one and eight-tenths and France least of all, or only about nine-tenths of one man per thousand.

This is so notwithstanding our coal mining conditions are more favorable to the safety of the workmen employed than those of any other part of the world. The great loss of life comes from carelessness of mining, from the use of improper explosives and from a lack of the means for the prevention of accidents. It is to remedy these things that the Bureau of Mines was created.

The Big Pittsburg Cylinder.

The Bureau of Mines is a branch of the Interior Department. It occupies a new building back of the Patent Office here at Washington, but its chief experiment stations are scattered throughout the mining regions. The most important of these is at Pittsburg, where there are all sorts of arrangements for testing explosives and studying the rescue work, both above and below ground. One of the most interesting pieces of apparatus there is a great steeli cylinder, 100 feet long and so thick that a man without stooping can stand upright within it. This is to represent a mine tunnel.

At one end of the cylinder is a cannon embedded in concrete, which closes the mouth of the cylinder, and at the other end is a paper diaphragm which holds in the gas, fire, damp or dust which ma ybe forced into it. When the cylinder is filled with natural gas it has practically the same conditions as though it were full of fire damp. The natural gas explodes the same way, and by watching its explosions the effect of the various mediums can be seen. In the top of the cylinder, at six feet apart, are manholes with lids which fly open at each explosion to let the smoke and gas out.

Different kinds of powders are tested, the purpose being to find which explosives may be safely used in the mining of different coals. The result is that we already know that many of the explosives in common use are not safe, and that the miner who lights a fuse attached to them takes his life in his hands when he does so.

Coal Dust Explosions.

One of the most interesting results of these tests has been to show that coal dust alone is even more deadly than fire damp or dust mixed with fire damp. In the past both miners and mine operators have believed that the dust would not ignite unless from a fire damp explosion and that dust in a mine free from gas could not explode. To test this a lot of dust was put in the steel tube, which was then free from gas. The cannon was loaded with black powder tamped with clay and discharged. The result was a terrible explosion, which threw open the manholes and sent great volumes of smoke and flames into the air.

Indeed, the danger from this source is so great that Director Holmes has issued a circular instructing the miners to keep the mines clean of dust, and suggesting that they sprinkle the dust with water or cover it with rock, clay or sand. Dr Holmes says that dry coal dust floating in the air will explode whether there is any inflammable gas present or not, and that the finer the dust the greater the explosion. Some of the dust in the Pittsburg cylinder was so fine that it passed through a sieve with a mesh of 200 openings to an inch. This exploded when there was only a small proportion of it in the air.

The Bureau of Mines advises that the coal dust should be frequently washed from the timbers and the mines be kept wet. They say that a dry mine is a dangerous mine and that the finer the dust the more water required. Under no conditions should coal dust be used for tamping the holes filled with other explosives.

The Danger From Dust.

Dr. Holmes tells me that many explosions of coal dust have occurred in and about coal bins and that similar explosions have happened in coal crushing rooms. There were some explosions of that kind last year at St. Louis and there was one in a cement plant in Colorado. In the latter case nine men were so badly burned by the flaming dust that they died.

It must not be thought that coal dust is the only kind of dust that will explode without inflammable gas. The dusts of flour, starch and sugar, all of which contain carbon, will do the same thing. This is well known in the flour milling centres, many of the mills having been blown to pieces by such explosions. One such instance occurred at Minneapolis in 1878, and another at Granite City, Ill., in 1910. Other mineral substances than coal have dusts that will explode. This is so of grahamite and gilsonite, both of which contain carbon. Last December a violent explosion which was due to dust occurred in one of the asphalt mines of Oklahoma.

Permissible Explosives.

The busines of making explosives is an important one. We have 150 different plants engaged in it and their output is something like 500,000,000 pounds a year. They are of different grades and some so dangerous that many people are killed by them. In their transportation alone several million dollars' worth of property is annually destroyed. The government is making tests of the various kinds, the work done by Professor Charles E. Munroe, of the George Washington University, who is noted as an expert in the science, and by Clarence Hall, of the Bureau of Mines. These men have issued "An Explosives Primer for Miners" and they have tested a number of explosives in the great Pittsburg cylinder, which has been filled with gas and mixtures of gas and dust and of coal dust alone for this purpose. The gas and other mixtures are set off by electris detonators. If the explosive passes the test, it is marked permissible. The permissible ones are now well known to the miners and mine operators, and the latter are glad to use them to avoid the blame and dangers that might arise if other unapproved explosives were used, to say nothing of their desire for the good of the miner.

In the European Mines.

So far we have no laws requiring the use of approved explosives only. It is different in Europe. Germany, France, Belgium and Great Britain have long had commissions studying and testing the various explosives, and they have prohibited those known to be dangerous. There are about fifty different kinds which are safe, and some of these have been found incapable of igniting a mixture of fire damp and air, even with a charge forty times as great as that of the old explosives, which invariably caused an explosion. Belgium restricts the amounts of the materials that may be used, and the safety powders there are rapidly driving out the dangerous black powders of the past.

Belgium, France and Germany require all mines to furnish arrangements for speedy aid to the injured, and each must have rescue devices. There are penalties for both operators and miners, and also mine inspectors, who may close the mines by injunction if the laws are not complied with. As a result the accidents are few, averaging much less per million tons of coal than with us. As it is now we are killing six me nfor every million tons of coal we get out.

Mine Rescue Cars.

The Bureau of Mines has a number of stations scattered through the chief mining centres, and, in addition, it has recently put on six mine rescue cars. These are Pullmans, especially equipped to meet every exigency of the mine rescue work. Each has its headquarters in the chief city of an extensive mining district, and it is kept in such shape that it can leave any hour of the day or night on telegraphic summons to aid in a mine disaster.

Each car is manned by a crew of miners trained in rescue work. It is officered by a mining engineer as chief and a mine foreman or mine superintendent who has been especially trained for the purpose as assistant chief. It has also a Red Cross surgeon and other men.

These cars are hospitals on wheels and school rooms on wheels as well. While not busy in mine disasters, they are taken from town to town in the mining districts and the mining engineers give lectures to the whole body of miners, showing them how to avoid danger and giving them advice as to what to do in emergencies. In most places the miners are persuaded to organize rescue corps, and these are trained by the men on the cars. It is expected that by the close of this year 3,000 or 4,000 men will belong to such corps. The lecturers treat also of the use of explosives, of electrical equipment and of fire prevention and sanitation.

Oxygen Helmets.

During my visit to the Bureau of Mines this afternoon I was shown some of the oxygen helmets and other machinery for use in these great mine disasters. Each car has eight of these helmets, a dozen safety lamps, as well as 2,000 feet of telephone wire and a field telephone. The oxygen helmets are so made that they can be applied to the face and fed with oxygen from a tank which is carried on the back. They are so fitted to the head that not a particle of gas or other air outside this oxygen supply can get into the lungs, and the arrangement is such that a miner so equipped can remain, without injury, for two hours in a room filled with gas or fire damp. In addition to the oxygen tank at the back there is another tank which contains certain chemicals through which the air emitted from the lungs passes, and is thereby relieved of its poisonous qualities. Another interesting feature is a telephone transmitter inside the helmet, while a receiver is attached outside it to the ear of the wearer. A wire from this extends to the surface, so that the rescue man in the helmet while down in the mine is in constant communication with the men at the surface. The telephone wire is marked in fifty-foot lengths, and from the amount of wire used the men on top can tell just how far away the men below are.

These helmets cost about $200 apiece, but they have proved to be invaluable, as was shown at the Cherry mine disaster, where the rescuers were able to get twenty men out alive after they had been entombed seven days. It is true that Joseph Evans lost his life while using one at the Pancoast disaster at Throop, Pa., but that was because he did not calculate that a man working hard would consume much more oxygen than while at rest.

One end of each of the rescue cars is fitted up as a tight room to be used in training men in the use of helmets. This room is filled with noxious fumes and gases, in which the miners wearing the helmets stay for two hours. The atmosphere is such that one would die without the helmets. Similar air-tight rooms have been put up at the various stations; and some of these have been made to resemble a miniature coal mine after it has been wrecked by an explosion.

Will Make a Dead Man Breathe.

Another most interesting apparatus with which these cars are fitted is one which pumps oxygen into the lungs of a man, making him breathe whether he be conscious or not. Indeed, it is said it will make even a corpse breathe, although it cannot, of course, restore life. It forces the oxygen in and sucks it out, making a continuous breathing very much like nature.

I was shown this machine by Mr. John L. Cochrane, of the Bureau of Mines, who allowed me to test it upon myself. The apparatus was fitted closely over my face, covering my chin and nostrils. Then by touching a button the oxygen was turned on and I found my lungs pumped full and sucked empty in a natural operation of breathing. I was first asked, however, whether my heart was all right, although Mr. Cochrane assured me that there was no great danger, even though it were weak. He said that the machine should be in every hospital, and in every equipment of first-aid-to-the-injured, and especially at seaside resorts where drawnings are frequent.

In place of lifting the arms back and forth and trying to pump air into the body the machine does the work better and with more regularity. On one occasion four men who had been in a mine for twenty-six hours after an explosion were left for dead by those who discovered them. Later it was observed that one of the bodies felt a little warm under the arms. The others were as cold as the grave. This machine was brought into action, and it soon brought life back to the man slightly warm. It was then tried upon the other three, with the result that all four are alive to-day.

Miners, Mine Owners and the Public.

Dr. Holmes believes that his bureau will do much to bring about closer relations between the miners and the owners. They are mutually interested in these movements to prevent accidents and to save life, and are working together. He says that our mines are operated at a comparatively small profit, and that the European owners, owing to low wages and the high price they get for their coal, can afford to mine better and to give their workmen better conditions of safety. He estimates that we lose over 200,000,000 tons of coal every year by our wasteful methods of mining, and says that this loss of life and money could be greatly reduced by government inspection and by the co-operation of the mine owners and miners, and perhaps of the public as well. He tells me that of the $3 or $6 per ton that is paid for coal, only $1, it is estimated, goes back to the mine to be divided between the miner, the operator and the landowner, and that dollar pays for the equipment and development of the mine, all the labor and costs and danger of mining operations, and the loading of the coal on the cars ready for shipment. The balance, which is from two-thirds to five-sixths of the price we pay for our coal, goes to the railroads and the middlemen who handle it. This is manifestly an unfair division on the part of both the consumer and miner, and enough should be taken out to warrant the latter the best of protection.

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Heathsville Social News

[Special to The Times-Dispatch.]

Heathsville, Va., September 9.—Miss Linda Sims, of Kinsale, who has been visiting at the home of C. Harding Walker, has returned to her home.

C. B. Whitehouse and wife, of Fredericksburg, were recent visitors in Heathsville.

Mrs. Luther Hayes and two sons, Luther and Warren, are the guests of Mrs. E. M. Raines.

W. W. Routten, professor of manual arts in the State Normal, of Alabama, is the guest of his father, Rev. J. T. Routten.

Miss Garnett Booker, of Lottsburg, is visiting at the home of Dr. Kemp, in Charles county, Md.

Miss Bragg and Miss Carroll Bragg, of Charlottesville, are guests of Miss Marie Walker.

Mrs. O. J. Henderson and son, Cralle, of Montgomery, W. Va., are visiting Mrs. F. A. Cralle, at "Campbellton," her home, near Heathsville.

Misses Maud Hardwick and Julia Dameron, of Kinsale, are guests of Miss Estelle Betts, at "Poplar Farm."

Miss Lulie Downing, who has been visiting friends in Culpeper, has returned to her home here.

J. B. Cralle, of Colorado Springs, who has been the guest of his mother for the summer, is now in Washington for a brief stay.

Mrs. Curry and brother, of Charleston, W. Va., are visiting the former's daughter, Mrs. W. H. Boyd.